26.5 GHz LOW-POWER DIGITAL RF RECEIVER MODULE

100 kHz to 26.5 GHz

80 MHz maximum real-time bandwidth
Low power consumption: ≤22 W
Digital I/Q output via Gigabit Ethernet

The OZY21-AH-UT combines analog RF processing and digital signal processing in one module. It receives RF signals from an antenna and outputs digital baseband data via Gigabit Ethernet. Its maximum real-time bandwidth is 80 MHz, and its panorama scan speed is better than 100 ghz/s (rbw=25 khz). The built-in GPS module timestamps data for use in time difference of arrival (TDOA) geolocation systems. The module can operate as an RF sensor or be integrated into a customer system.

Typical Applications

- Radio spectrum management
- General spectrum analysis
- Electromagnetic environment support for low-altitude applications
- Signal reconnaissance and analysis
- Satellite navigation monitoring
- OEM integration into customer systems

General Specifications

Frequency Range	100 kHz to 26.5 GHz
Maximum Real-Time Bandwidth	80 MHz
Primary Functions	FFM, PSCAN, FSCAN, MULTN, DPS

RF Performance

Frequency Accuracy	Better than 0.5 ppm; better than 0.005 ppm (with GPS connected)
Phase Noise	-95 dBc/Hz at 10 kHz offset (1 GHz carrier frequency)
Noise Figure	≤13 dB (100 kHz to 5999.99 MHz) ≤14 dB (5999.99 MHz to 7999.99 MHz) ≤16 dB (7999.99 MHz to 26500 MHz)
Second-Order Intercept Point (IP2)	Better than 45dBm
Third-Order Intercept Point (IP3)	Better than 10dBm
IF Rejection	Better than 85 dB
Image Rejection	Better than 85 dB

Digital Processing Specifications

Panorama Scan Speed	Better than 100 GHz/s (RBW=25 kHz)
DDC Channel Configuration	1 wideband channel (80 MHz) + 4 narrowband channels (500 kHz each), standard
I/Q Data Acquisition	Single-packet mode: continuous I/Q data within each packet; 8 to 250,000,000 complex samples. 32 bits per complex sample: 16-bit I and 16-bit Q. Continuous mode: with Gigabit Ethernet output only, I/Q data continuity is guaranteed at 10 MHz bandwidth.
Minimum Signal Duration for 100% Probability of Intercept (POI)	500 ns

Interfaces, Power and Environmental Specifications

Communication Interfaces	Gigabit Ethernet (RJ45)
Power Consumption	≤22 W
Operating Temperature	-35 °C to +60 °C
Storage Temperature	-40 °C to +70 °C
Dimensions	155 × 85 × 26 mm

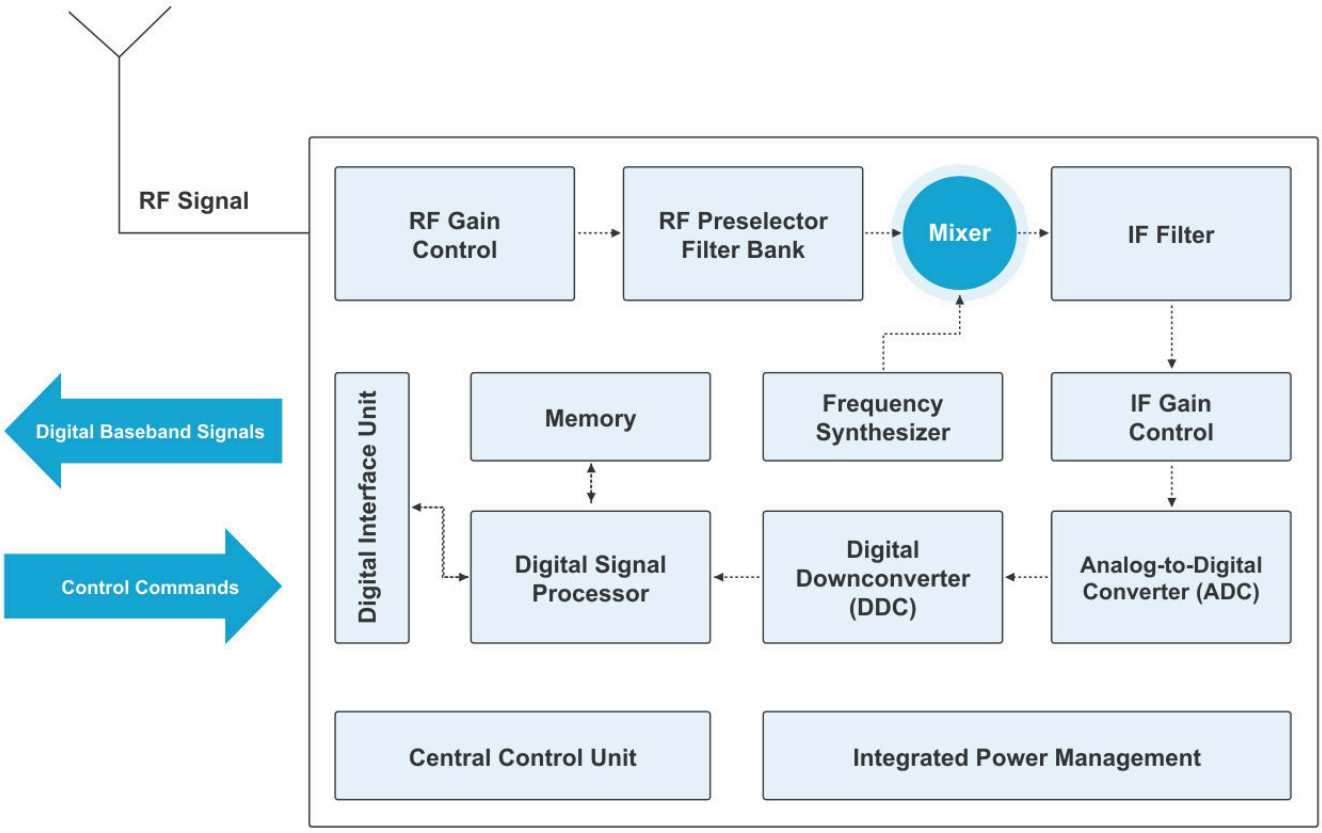
Operating Principle Overview

Developed in-house, these digital RF receiver modules combine analog RF processing and digital signal processing in an integrated architecture. The functional block diagram is shown below. The modules accept RF signals from an antenna and output digital baseband signals via digital interfaces such as Ethernet and USB. They can operate directly as RF sensors for monitoring and reception of a wide range of challenging signals, or be integrated into other systems with minimal integration effort, short development cycles, consistent performance and stable operation.

Product-Family Overview

The operating principle and features below describe the overall product family. The listed performance figures do not apply to every model. For the specifications of this model, refer to the technical specifications on pages 2-3.

Product-Family Highlights: compact form factor; **wide bandwidth** (508.8 MHz); **broad frequency coverage** (40 GHz); **high frequency accuracy** (0.5 ppm); **real-time signal capture** (20 ns pulse capture); **high-speed scanning** (2000 GHz/s at RBW = 25 kHz); and **expandability** (support for streaming I/Q data to disk at a signal bandwidth of 320 MHz).



Digital RF Receiver Module - Functional Block Diagram

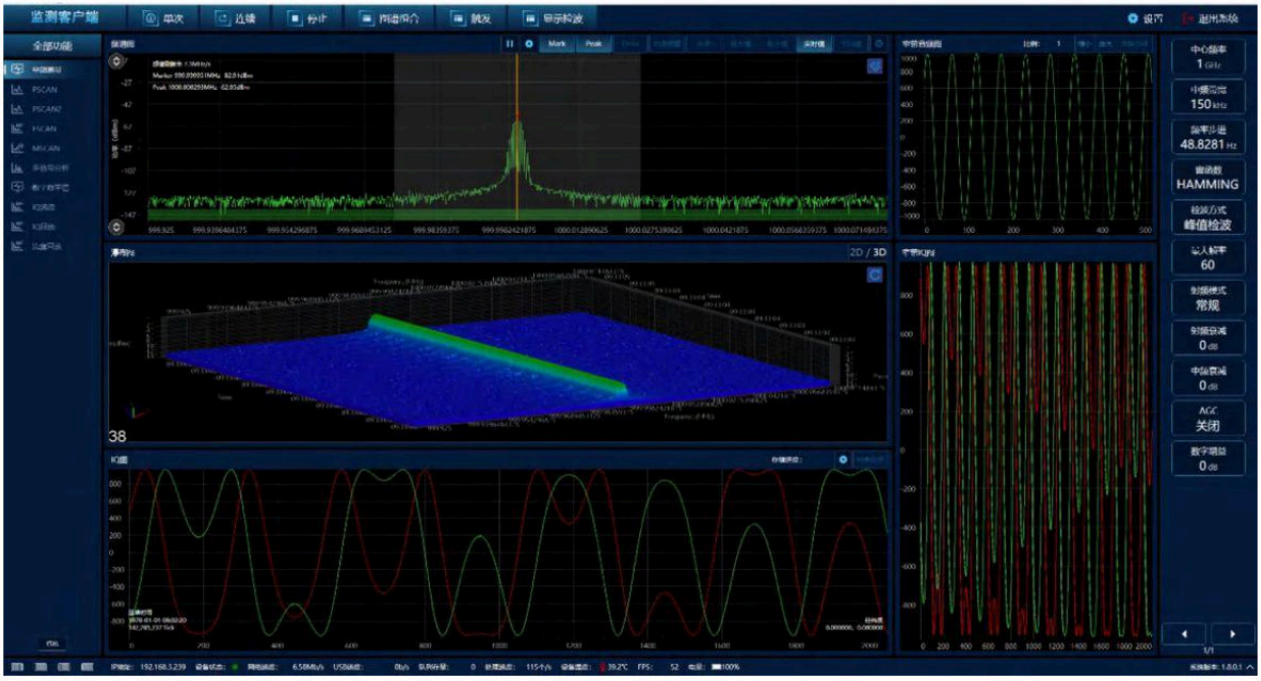
Functional Overview

Supported modes: FFM, PSCAN, FSCAN, MULTN, DPS.

Fixed-Frequency Monitoring (FFM)

In FFM mode, the module converts RF signals within a selected bandwidth at any center frequency in its operating range into digital baseband data through analog downconversion and digital signal processing. The processing section provides independent digital downconverter (DDC) channels: one wideband channel and 4 narrowband channels. It supports FFT-based spectrum analysis and AM/FM demodulation, and outputs I/Q, spectrum and audio data.

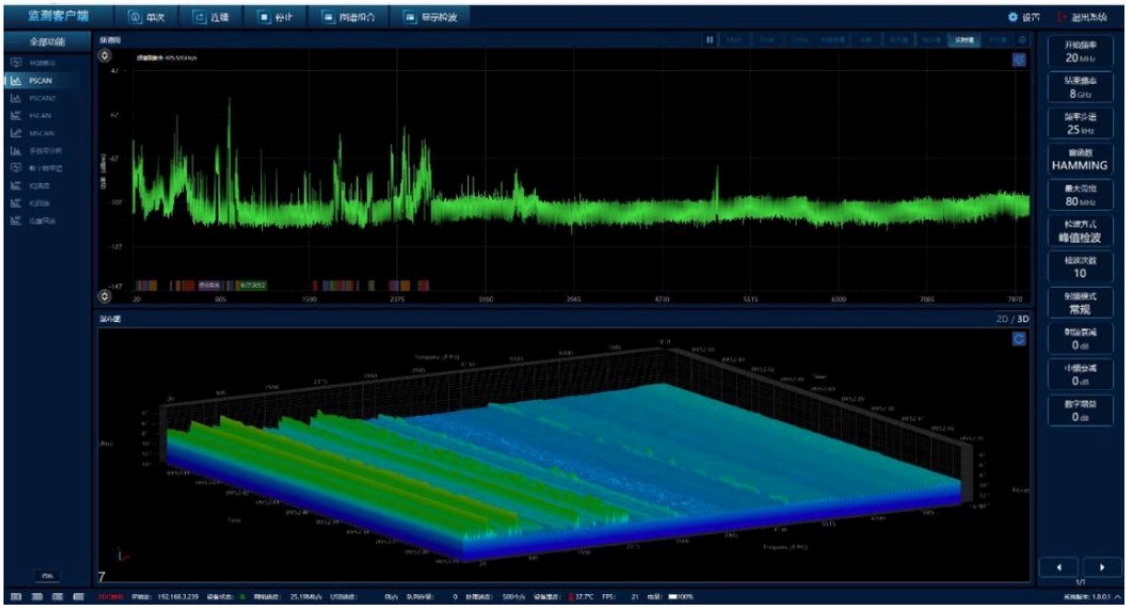
The built-in GPS module provides high-accuracy timestamps after satellite lock is acquired. The timestamped data can be used for TDOA geolocation and signal analysis.



Fixed-frequency monitoring

Panorama Scan (PSCAN)

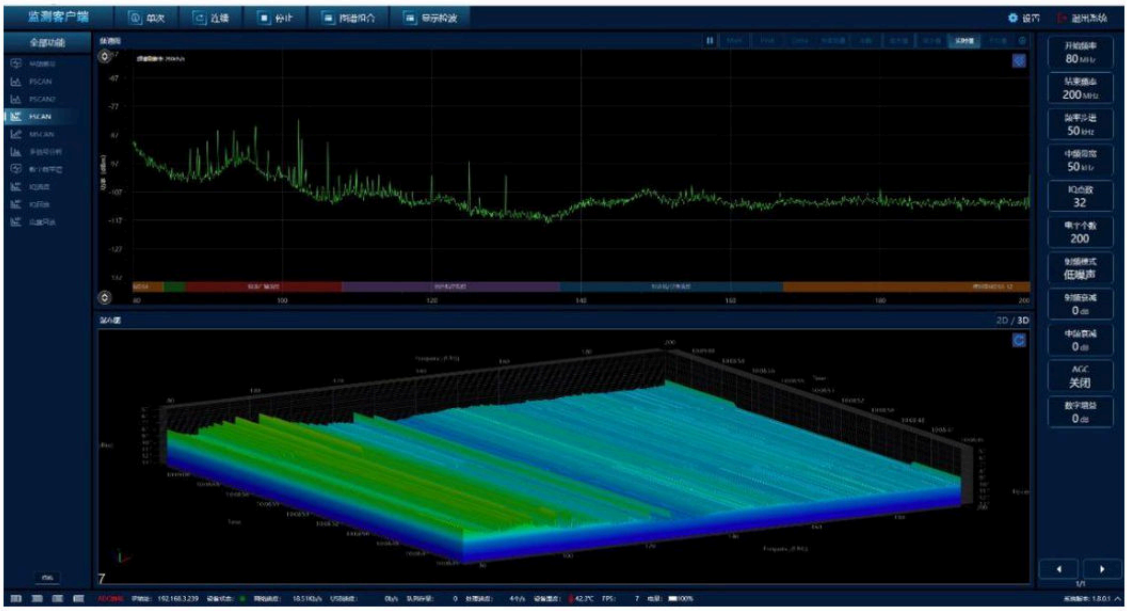
In panorama scan mode, the module scans a selected frequency range using successive FFM measurements. The center frequency is stepped by an amount equal to the FFM measurement bandwidth, covering the selected frequency range.



Panorama scan

Frequency Scan (FSCAN)

In frequency scan mode, the module performs a fine scan over a selected range within its operating frequency range. It calculates signal power in the time domain and outputs the resulting spectrum data.



Frequency scan

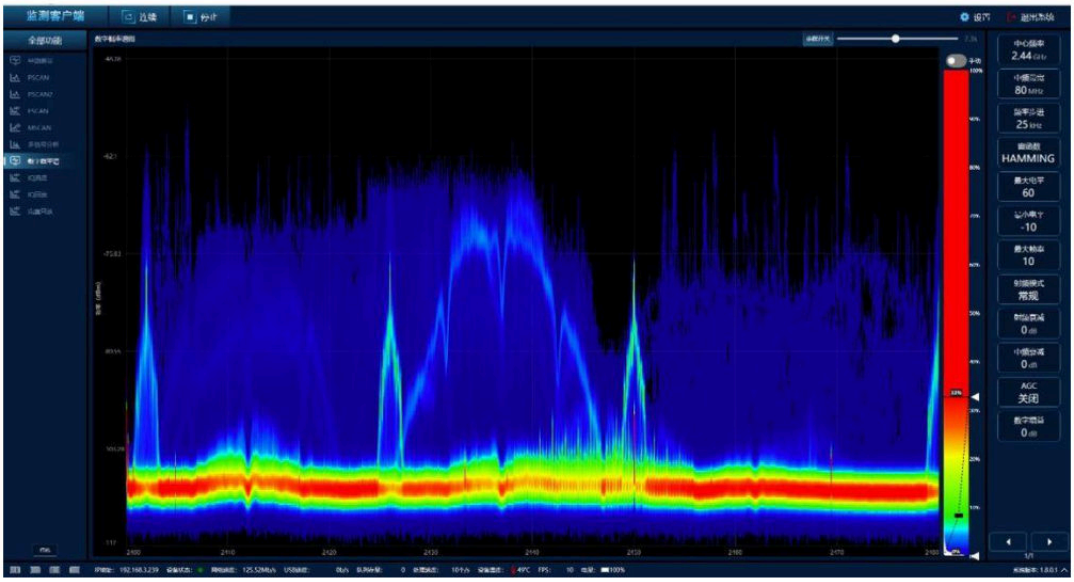
Multi-Channel Analysis (MULTN)

In multi-channel analysis mode, the module provides 1 wideband channel (80 MHz) + 4 narrowband channels (500 kHz each), standard The center frequency of each narrowband DDC can be set within the wideband channel. The module supports FFT-based spectrum analysis and AM/FM demodulation, and outputs spectrum, I/Q and audio data.

Multi-channel analysis

Digital Probability Spectrum (DPS)

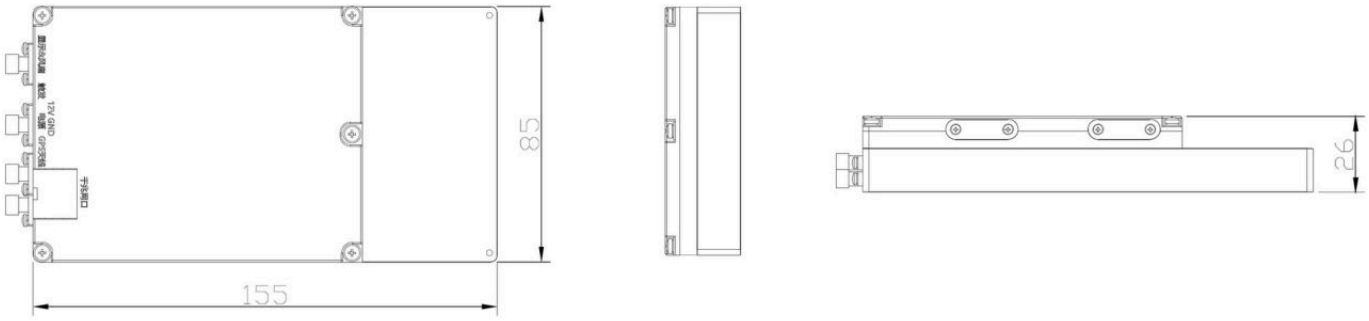
In DPS mode, the module rapidly accumulates spectrum frames. Over a period of time, it counts occurrences at each frequency and amplitude and displays the results using a color scale. This display helps reveal co-channel signals. The module can also output spectrum data directly.



Digital probability spectrum

Outline Dimensions

All dimensions are in millimeters.



Mechanical outline drawing